

REMARKS

By this response, Claims 1, 2, 5-8, 11-13, 16 and 17 have been amended, and new Claims 21-24 have been added, leaving Claims 1-24 pending in the application. The specification has been amended to correct minor informalities. No new matter has been added by the amendments.

Reconsideration and allowance are respectfully requested in view of the following remarks.

Restriction Requirement

Applicants affirm the election, with traverse, of Group I, Claims 1-11. Claims 12-20 stand withdrawn from consideration as being drawn to non-elected subject matter.

Claims 12 and 17, which are directed to a method, have been amended to depend from respective Claims 1 and 8, which are directed to an apparatus (i.e., a product). According to MPEP § 821.04, "if applicant elects claims directed to the product, and a product claim is subsequently found allowable, withdrawn process claims which depend from or otherwise include all the limitations of the allowable product claim will be rejoined" (emphasis added). Accordingly, once Claim 1 and/or Claim 8 is found allowable, then withdrawn Claim 12 and/or Claim 17 (and claims dependent therefrom) should be rejoined with elected Group I.

Objection to Claims

Claim 5 has been objected to for the reasons stated on page 3 of the Official Action. Claim 5 has been amended to depend from Claim 4 to provide antecedent basis.

Withdrawal of the objection is respectfully requested.

First Rejection Under 35 U.S.C. §103

Claims 1-6 and 11 stand rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 5,609,720 to Lenz et al. ("Lenz") in view of U.S. Patent No. 6,015,595 to Felts ("Felts").¹ The reasons for the rejection are stated on pages 3-6 of the Official Action. The rejection is respectfully traversed.

Claim 1 is directed to a multiple zone gas distribution apparatus for controlling temperature across a workpiece during processing. The recited apparatus comprises "a chuck having a top face ... defining inner and outer zones between the top face of the chuck and the workpiece into which zone coolant gas may be admitted; inner and outer zone feed lines adapted to feed the coolant gas to the inner and outer zones of the chuck; a pressure and flow control system adapted to supply zone coolant gas to the feed lines with separate pressure for the inner and outer zones controlled to control the temperature across the workpiece; and inner and outer zone bleed lines connected to the inner and outer zone feed lines between the pressure and flow control system and the chuck, the inner zone bleed line having a connecting line in fluid connection with the outer zone bleed line and a fixed orifice

¹ Claim 11 depends from Claim 8, which has not been rejected under this ground of rejection. Accordingly, for purposes of this response, Applicants have assumed that Claim 11 was inadvertently rejected.

adapted to continuously bleed the pressure of the inner zone during processing of the workpiece, and the outer zone bleed line having a evacuation valve for pressure release" (emphasis added).

According to the apparatus recited in Claim 1, as amended, the inner and outer bleed lines of the apparatus can relieve excess pressure from the inner and outer zones and/or allow evacuation of the inner and outer zones. The fixed orifice of the inner zone bleed line is adapted to allow continuous bleeding of pressure of the inner zone during processing. The fixed orifice can also prevent excess pressure from the inner zone migrating into the outer zone.

An exemplary embodiment of the claimed apparatus is shown in FIG. 1. The apparatus includes an inner bleed line 52 having a connecting line 68 connected to the outer bleed line 54 and an orifice 60 positioned along the connecting line 68. Gas can be bled via the inner bleed line 52 and connecting line 68 to an exhaust via the outer bleed line 54. See the description at paragraphs [0021] and [0022] of the present specification.

The Official Action asserts that the combination of Lenz and Felts would have rendered obvious the apparatus recited in Claim 1. The Official Action contends that Felts discloses a plasma apparatus "in which adjustable valve 49 can be replaced with [a] fixed orifice to provide predetermined flow of gas," and that it would have been obvious to replace Lenz's adjustable valve 50 arranged along the center gas bleed line 47 with "a fixed orifice as taught by Felts in the inner zone bleed line (He exhaust line) to provide predetermined flow of gas." Applicants respectfully disagree.

In the Lenz apparatus, the gas bleed lines 47, 48 and 49 are connected to the respective zone coolant gas feed lines 36, 37 and 38. However, the gas bleed lines 47, 48 and 49 are not connected to each other by a connecting line, as claimed.

Felts does not suggest modifying the Lenz apparatus to include a connecting line fluidly connecting the gas bleed line 47 to either of the gas bleed lines 48 or 49. Felts discloses a deposition plasma apparatus. The reactor system 10 shown in FIG. 1 includes a gas line 50 and a central gas inlet 41 through which process gas can be introduced into the chamber 14 from a process gas source 42. The gas source does not supply a zone coolant gas to a chuck, as claimed. The process gas source 42 includes a regulator 44, and a shut-off valve 47 and a metering valve 49 are arranged along the gas line 50 to control the process gas flow. Applicants note that the gas line 50 is not connected to another gas line.

Although Felts discloses that the metering valve 49 can be replaced with a fixed orifice "to provide a predetermined flow of the first process gas and the first gas component" (into the chamber 14) (see column 6, lines 3-8), Felts does not suggest modifying Lenz's apparatus to result in the combination of features recited in Claim 1, including at least the features of "the inner zone bleed line having a connecting line in fluid connection with the outer zone bleed line and a fixed orifice adapted to continuously bleed the pressure of the inner zone during processing of the workpiece." Lenz's apparatus includes bleed valves 50, 51 and 52 positioned along gas bleed lines 47, 48 and 49, respectively. Felts provides no motivation to modify one of the gas bleed lines 47, 48, 49 to have a connecting line in fluid connection with another one of the gas bleed lines. Accordingly, the apparatus recited in Claim 1 is patentable over the combination of Lenz and Felts.

Dependent Claims 2-6 and 11 are also patentable over the applied combination of references for at least the same reasons as those for which Claim 1 is patentable.

Therefore, withdrawal of the rejection is respectfully requested.

Second Rejection Under 35 U.S.C. §103

Claim 7 stands rejected under 35 U.S.C. § 103(a) over Lenz in view of Felts and further in view of U.S. Patent No. 6,254,683 to Matsuda et al. ("Matsuda"). The reasons for the rejection are stated on page 6 of the Official Action. The rejection is respectfully traversed.

Claim 7 depends from Claim 1. The Official Action acknowledges that the combination of Lenz and Felts does not suggest the apparatus recited in Claim 7. However, it is asserted in the Official Action that Matsuda cures the deficiencies of Lenz and Felts. Applicants respectfully disagree.

As explained above, the combination of Lenz and Felts does not suggest modifying Lenz's apparatus to include a connecting line fluidly connecting the bleed line 47 to the bleed line 48 or 49.

Applicants submit that Matsuda fails to provide the required suggestion or motivation to modify Lenz's apparatus to result in the apparatus recited in Claim 1. The Official Action refers to the apparatus shown in Fig. 1 of Matsuda, which includes a gas supply line 18, an evacuation line 19, and a bypass line 17b connected to the evacuation line 19. At the least, Matsuda does not suggest modifying Lenz's apparatus to include the features of "the inner zone bleed line having a connecting line in fluid connection with the outer zone bleed line and a fixed

orifice adapted to continuously bleed the pressure of the inner zone during processing of the workpiece," as recited in Claim 1, much less to also modify Lenz to result in the apparatus recited in Claim 7. Thus, Claim 7 is patentable over the applied references.

Therefore, withdrawal of the rejection is respectfully requested.

Third Rejection Under 35 U.S.C. §103

Claims 8-10 stand rejected under 35 U.S.C. § 103(a) over Lenz in view of Felts and further in view of JP 10163308 A ("JP '308"). The reasons for the rejection are stated on page 7 of the Official Action. The rejection is respectfully traversed.

The Official Action acknowledges that the combination of Lenz and Felts does not suggest the apparatus recited in independent Claim 8. However, it is asserted in the Official Action that JP '308 cures the deficiencies of Lenz and Felts with respect to the apparatus recited in Claim 8 (and in dependent Claims 9 and 10). Applicants respectfully disagree.

Independent Claim 8, as amended, recites an apparatus for detecting dechucking in a multiple zone wafer cooling system. The recited apparatus comprises "a chuck having a top face ... defining inner and outer zones between the top face of the chuck and the workpiece into which zone coolant gas may be admitted; first and second zone feed lines adapted to feed the coolant gas to the inner and outer zones of the chuck; a pressure and flow control system adapted to supply zone coolant gas to the feed lines with separate pressure for the first and second zones controlled to control the temperature across the workpiece; and first and second zone bleed lines connected to the first and second zone feed lines

between the pressure and flow control system and the chuck, the first zone bleed line having a connecting line connected in fluid connection with the second zone bleed line and a fixed orifice positioned along the connecting line adapted to continuously bleed the pressure of the first zone during processing of the workpiece; and wherein the pressure and flow control system provides a signal indicating dechucking when the flow rate increases more than a predetermined amount” (emphasis added). For reasons discussed above, Lenz and Felts fail to suggest the combination of features recited in Claim 8.

Moreover, JP ‘308 fails to suggest modifying Lenz’s apparatus to result in the combination of features recited in Claim 8, including at least the features of “the first zone bleed line having a connecting line in fluid connection with the second zone bleed line and a fixed orifice adapted to continuously bleed the pressure of the first zone during processing of the workpiece.” Accordingly, the apparatus recited in Claim 8 is patentable over the applied combination of references.

Dependent Claims 9 and 10 are also patentable over the applied combination of references for at least the same reasons as those for which Claim 8 is patentable.

Therefore, withdrawal of the rejection is respectfully requested.

New Claims

New Claims 21 and 23 depend from Claims 1 and 8, respectively, and recite the features of “the fixed orifice is positioned along the connecting line.” Support for Claims 21 and 23 is provided in FIG. 1 of the drawings. New Claim 22 depends from Claim 21 and recites the features of “the inner zone bleed line is adapted to be bled via the connecting line and the outer zone bleed line.” New Claim 24 depends from

Claim 23 and recites the features of "the first zone bleed line is adapted to be bled via the connecting line and the second zone bleed line." Claims 21-24 are also patentable.

Conclusion


For the foregoing reasons, allowance of the application is respectfully requested. If there are any questions concerning this response, the Examiner is respectfully requested to contact the undersigned at the number given below.

Respectfully submitted,

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Date: July 27, 2005

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